RAPITA Systems
A BAE SYSTEMS Company

Product brief

Visualizing RTOS scheduling and event tracing with RapiTask

RapiTask

How can RapiTask help you?

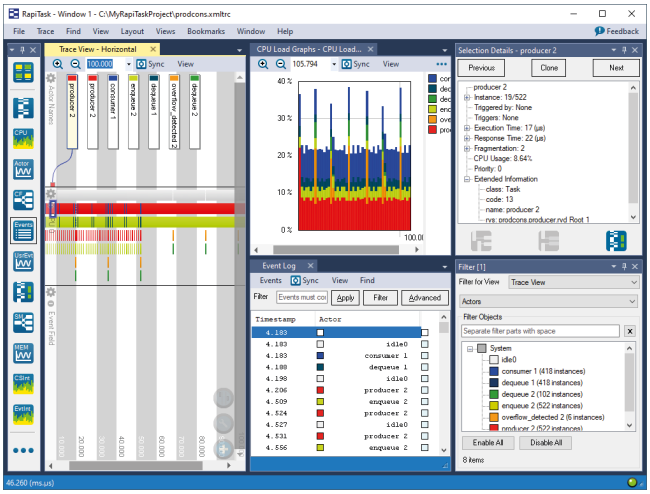
RapiTask helps embedded software engineers to understand the scheduling behavior of their software, and to identify and debug potential issues.

As it is target-independent, RapiTask can help you to understand the scheduling behavior of even the most complex critical systems, including multicore systems.

Use cases of RapiTask

Understand system scheduling behavior

RapiTask lets you see the scheduling behavior across threads and processor cores.



Locate rare timing events such as race conditions

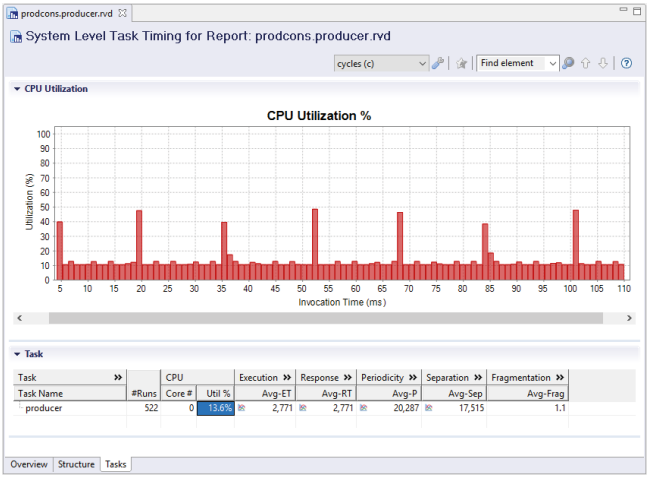
RapiTask lets you easily search large traces for specific timing events and quickly locate specific patterns within a trace.

Verify actual timing behavior

RapiTask helps you to understand the actual timing behavior of your system by providing information on system-level properties such as periodicity and jitter.

Understand system capacity issues

RapiTask shows peak CPU utilization (CPU load), average CPU utilization, and fragmentation (the number of pre-emptions/ interrupts). These statistics are summarized in a report.



Quickly identify user-level events

RapiTask provides customizable coloring of tasks and supports visualization of OS-level features such as alarms, events, mailboxes, mutexes etc.

Benefits of using RapiTask

- Rapid debugging of timing issues
- Not tied to a specific RTOS vendor
- Streamlines analysis by letting you customize task coloring, hide tasks and jump to trace locations
- Helps you visualize large traces quickly
- Reduces debugging and verification effort
- Easily integrated with RVS, offering a wide range of capabilities such as worst-case execution time analysis

Key features of RapiTask

Task-level timing analysis

- Automated collection of task-level timing metrics on-target and on-host
- Analysis configurable to include or exclude specified modules/functions/directories
- Calculation of system-level scheduling metrics and related data:
  - Response time
  - Periodicity
  - Jitter
  - CPU utilization (CPU load)
  - Fragmentation
- RTOS-independent scheduling visualization

Language support

- Ada 83, 95, 2005 and 2012, compilers including GNAT Pro and Green Hills
- C and C++, compilers including Visual Studio, GCC, Diab and TASKING
- Assembly code insertions
- Mixed language source code

Build integration

- Multiple strategies available:
  - Compiler wrappers
  - Clone integration
  - Scripting into build system directly
- Support for very large code bases
- Support for legacy compilers
- Instrumentation can be split between build cycles
- Shared integration with other R**VS** tools

Target integration

- Flexible trace collection using CAN, Serial, Ethernet, debuggers, in-memory trace buffers, hardware I/O tracing, hardware tracing support *e.g.* Nexus, and our own **RTB**x data logger
- Extremely low overhead instrumentation library for 8, 16, 32 and 64 bit architectures
- Minimize instrumentation overheads by only instrumenting context switch routines
- No library/run-time dependencies or dynamic memory requirements
- Timing analysis across power cycles (subject to hardware requirements)
- Data collection freeze and reset to eliminate accidental tracing
- Extremely fast, lock-free, thread-safe tracing mechanism
- Support for multicore processors

Third party integration

- Tools such as Mx-Suite™, MATLAB Simulink and GNAT GPS
- Continuous build servers *e.g.* Jenkins, Bamboo
- Debuggers *e.g.* Lauterbach, i-SYSTEM
- Out-of-the-box integration with DDC-I's Deos operating system

Integrated testing environment

- Invocation timeline charts to help understand timing behavior at a glance
- Custom task coloring
- Hide tasks
- Jump to trace location
- Code viewer:
  - View source code alongside pre-processed and instrumented code
- Show other code metrics *e.g.* #LOC, #loops
- Aggregate results by directory, file and functions
- Database-like search function
- Mark source code to support verification of confidential code with third-party organizations

Compatibility

- Runs on host operating systems
  - Windows 7+ and Windows Server 2008 R2+
  - Linux distributions including Ubuntu and Red Hat
- Results can be collected from systems without supported operating systems and transferred to a supported system for analysis

Licensing

- Enterprise license gives you access to new versions, support and maintenance
- One-year support and maintenance included in purchase price
- Single price for all features
- Licenses transferrable across projects

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